

1. Rejection of Claims 1-8 and 10-15 Under 35 U.S.C. §112, 1st

Paragraph

The Office Action states,

Claims 1-8, 10-15 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contain subject matter, which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The phrase 'C1-C40 carbon-containing group' is not defined in the specification so as to ascertain the structure of compounds that are included and/or excluded by the phrase. Appropriate correction is required. In patent examination, it is essential for claims to be precise, clear, correct, and unambiguous. In *re Zletz*, 893 F.2d 319, 13 USPQ2d 1320 (Fed. Cir. 1989). Applicant must show possession of the invention by describing it with all the claimed limitations. *Lookwood v. American Airlines Inc.* 107 F.3d 1565, 1572, 41 USPQ2d 1961, 1966 (Fed Cir. 1997).

RESPONSE

Applicant respectfully traverses the rejection of claims 1-8 and 10-15.

In particular, there is a strong presumption that an adequate written description of the claimed invention is present when the application is filed. In *re Wertheim*, 541 F.2d 257, 263, 191 USPQ 90, 97 (CCPA 1976). With respect to the current rejection, the Examiner has taken exception to the phrase "C₁-C₄₀ carbon-containing group". However, the phrase "C₁-C₄₀ carbon-containing group" appears in Applicant's original claims and specification, and Applicant

respectfully believes one of ordinary skill in the art would appreciate the metes and bounds of the aforementioned phrase. A description as filed is presumed to be adequate, unless or until sufficient evidence or reasoning to the contrary has been presented by the Examiner to rebut the presumption. *In re Marzocchi*, 439 F.2d 220, 224, 169 USPQ 367, 370 (CCPA 1971). Accordingly, the Examiner has the initial burden of presenting, by a preponderance of evidence, why a person skilled in the art would not recognize in Applicant's disclosure a description of the inventive subject matter as defined by the claims. In rejecting a claim, the Examiner must set forth express findings of fact regarding an analysis which supports a lack of written description conclusion. See MPEP §2163.

As such, since the current rejection falls short of this standard, Applicant respectfully believes the current rejection should be withdrawn. Notwithstanding, if the Examiner maintains the current rejection, Applicant respectfully requests the Examiner to present objective, factual evidence why one skilled in the art would not recognize in Applicant's disclosure a description of the inventive subject matter as defined by the claims.

In light of the above, claims 1-8 and 10-15 are therefore believed to be patentable. Accordingly, reconsideration and withdrawal of the rejection is respectfully requested.

2. Rejection of Claims 1-8 and 10-15 Under 35 U.S.C. §112, 2nd

Paragraph

The Office Action states,

Claims 1-8, 10-15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The phrase 'C1-C40 carbon-containing group' is not defined in the claims so as to ascertain the metes and bounds of the claims. Appropriate correction is required.

RESPONSE

Applicant respectfully traverses the rejection of claims 1-8 and 10-15.

In particular, the Examiner's focus during examination of claims for compliance with the requirement for definiteness of 35 U.S.C. §112, second paragraph, is whether the claim meets the threshold requirements of clarity and precision, not whether more suitable language or modes of expression are available. Additionally, when the Examiner is satisfied that patentable subject matter is disclosed, and it is apparent to the Examiner that the claims are directed to such patentable subject matter, he or she should allow claims which define the patentable subject matter with a **reasonable** degree of particularity and distinctness. Additionally, "The requirement to 'distinctly' claim means that the claim must have a meaning discernible to one of ordinary skill in the art when construed according to correct principles. . . . Only

when a claim remains insolubly ambiguous without a discernible meaning after all reasonable attempts at construction must a court declare it indefinite." See MPEP §2173.02.

Accordingly, Applicant respectfully believes claims 1-8 and 10-15 fully comply with 35 U.S.C. §112, second paragraph, and that one having ordinary skill in the art would appreciate the metes and bounds thereof.

In light of the above, claims 1-8 and 10-15 are therefore believed to be patentable. As such, reconsideration and withdrawal of the rejection is respectfully requested.

3. Rejection of Claims 1-8 and 10-15 Under 35 U.S.C. §103(a)

The Office Action states,

Claims 1-8, 10-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ryabov et al., Organomettalics (2002), Vol. 21(14), pp. 2842-2855. Published on the Web 6/8/02.

Applicant claims a process of making compounds of formula I, comprising reacting a compound of formula II with a compound of formula III or IV, in the presence of at least one strong organic acid and at least one water absorbent. The reaction temperature is between 50-110°C. In preferred embodiments, the organic acid is alkylsufonic acid and the water absorbent is phosphorous pentoxide. Applicant also claims variable ratios of formula II:III and different amounts of the acid and absorbent.

Determination of the scope and content of the prior art (MPEP 2141.01)

Ryabov et al., teach similar processes wherein in scheme 2, H_3PO_4 and phosphorous pentoxide are used while in scheme 4, alkylsufonic acid and phosphorous pentoxide are used. In

scheme 2, the reaction is at 50°C while in 4 it is at room temperature. See paragraph 2, page 2850 and paragraph 1, page 2852.

Ascertainment of the difference between the prior art and the claims (MPEP 2141.02)

The difference between the instant invention and that of the Ryabov et al., is that applicant combines the 2 processes by Ryabov et al., into one process and claims 50-110°C instead of 50°C.

Finding of prima facie obviousness - rational and motivation (MPEP 2142.2143)

However, temperature range of 50-110°C embraces 50°C. Changing the temperature, ratios of formula II:III and the amounts of the acid and absorbent is a mere optimization of variables, which is not patentable absent unexpected result due to each variable, which is different in kind and not merely in degree from that of the prior art. In re Aller, 22 F.2d 454, 105 USPQ 233 (CCPA, 1955), In re Boesch and Slaney, 205 USPQ 215 (CCPA, 1980). For formula IV to produce formula I, it must dissociates in solution to 2 molecules of formula III.

Therefore, the instant invention is prima facie obvious from the teaching of Ryabov et al. One of ordinary skill in the art would have known to change the temperature, ratios of the starting reagents and the amounts of the acid and absorbent, at the time the invention was made. The motivation is to optimize the yield of the product.

Alternatively, Applicant has done no more than combine separate but well-known inventions (two separate processes by Ryabov et al). While the combination may perform a useful function it did no more than what they would have done separately. In re Anderson, 396 U.S. 57, 163 USPQ 673 (1969) cited in KSR Int. Co. v. Teleflex Inc, 550 U.S. ----, 82 USPQ2d 1385 (2007).

When a patent simply arranges old elements with each performing the same function it has been known to perform and yields predictable result, the combination is obvious. In re Sakraida, 425 US 273, 189 USPQ 449 (1976) cited in KSR, supra. A patent for such combination 'obviously withdraws what is already known into the field of its monopoly.' Great Atlantic & Pacific Tea Co. v. Supermarket Equipment Corp., 340 U.S. 147, 187 USPQ 303 (1950), cited

in KSR, *supra*.

RESPONSE

Applicant respectfully traverses the rejection of claims 1-8 and 10-15.

The U.S. Supreme Court in *Graham v. John Deere Co.*, 148 U.S.P.Q. 459 (1966) held that non-obviousness was determined under §103 by (1) determining the scope and content of the prior art; (2) ascertaining the differences between the prior art and the claims at issue; (3) resolving the level of ordinary skill in the art; and, (4) inquiring as to any objective evidence of non-obviousness.

Accordingly, for the Examiner to establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. See MPEP §2142.

First and foremost, the Examiner states in the current Office Action on page 4, lines 1-3,

The difference between the instant invention and that of the Ryabov et al., is that applicant combines the 2 processes by Ryabov et al., into one process and claims 50-110°C instead of 50°C.

However, Applicant respectfully traverses the Examiner's attempt to oversimplify Applicant's currently claimed novel process.

In particular, Ryabov, et al. discloses 5-methyl-4,5-dihydro-6H-cyclopenta[b]thiophen-6-one (i.e., Scheme 2) was prepared by first adding thiophene to methacrylic acid in dichloromethane, and then adding the mixture of thiophene and methacrylic acid to an **inorganic acid** (i.e., polyphosphoric acid) at 50°C. The process produced a **40% yield** of 5-methyl-4,5-dihydro-6H-cyclopenta[b]thiophen-6-one. See page 2850, second column, lines 32-48.

Additionally, Ryabov, et al. discloses a mixture of 2-methyl-2,3-dihydro-1H-cyclopenta[b][1]-benzothiophen-1-one and 2-methyl-1,2-dihydro-3H-cyclopenta[b][1]benzothiophen-3-one (i.e., Scheme 4) was prepared by first adding methacrylic acid to a solution of P₄O₁₀ in methanesulfonic acid **at room temperature, and then adding dropwise at room temperature** 1-benzothiophene to the solution of methacrylic acid, P₄O₁₀, and methanesulfonic acid. The process produced a **66% yield** of a mixture of 2-methyl-2,3-dihydro-1H-cyclopenta[b][1]-benzothiophen-1-one and 2-methyl-1,2-dihydro-3H-cyclopenta[b][1]benzothiophen-3-one. See page 2852, first column, lines 1-21.

Alternatively, Applicant is currently claiming a process for preparing heterocyclic ketones of formula (I) or (Ia) by reacting a heterocyclic compound of formula (II) with a carboxylic acid of formula (III) or an anhydride of formula (IV), wherein the process

comprises performing the reaction in a liquid reaction medium comprising at least one **strong organic acid** and at least one water absorbent, wherein the **strong organic acid** has a higher acid strength than the carboxylic acid of formula (III), and by **adding simultaneously** the heterocyclic compound of formula (II) together with the carboxylic acid of formula (III) or the anhydride of formula (IV) to the liquid reaction medium, and wherein the reaction is carried out at a **temperature ranging from 50 to 110°C**. Accordingly, Applicant respectfully believes Ryabov, et al. discloses two different and separate reactions, as compared to Applicant's currently claimed process.

Insomuch that the Examiner has acknowledged these differences in the current Office Action as outlined *supra*, the Examiner then tries to remedy these factual deficiencies by stating on page 4, line 5 - page 5, line 2,

However, temperature range of 50-110°C embraces 50°C. Changing the temperature, ratios of formula II:III and the amounts of the acid and absorbent is a mere optimization of variables, which is not patentable absent unexpected result due to each variable, which is different in kind and not merely in degree from that of the prior art. In re Aller, 22 F.2d 454, 105 USPQ 233 (CCPA, 1955), In re Boesch and Slaney, 205 USPQ 215 (CCPA, 1980). For formula IV to produce formula I, it must dissociates in solution to 2 molecules of formula III.

Therefore, the instant invention is prima facie obvious from the teaching of Ryabov et al. One of ordinary skill in the art would have known to change the temperature, ratios of the starting reagents and the amounts of the acid and absorbent, at the time the invention was made. The motivation is to optimize the yield of the product.

Alternatively, Applicant has done no more than combine separate but well-known inventions (two separate processes by Ryabov et al). While the combination may perform a useful function it did no more than what they would have done separately. In re Anderson, 396 U.S. 57, 163 USPQ 673 (1969) cited in KSR Int. Co. v. Teleflex Inc, 550 U.S. ----, 82 USPQ2d 1385 (2007).

When a patent simply arranges old elements with each performing the same function it has been known to perform and yields predictable result, the combination is obvious. In re Sakraida, 425 US 273, 189 USPQ 449 (1976) cited in KSR, supra. A patent for such combination 'obviously withdraws what is already known into the field of its monopoly.' Great Atlantic & Pacific Tea Co. v. Supermarket Equipment Corp., 340 U.S. 147, 187 USPQ 303 (1950), cited in KSR, supra.

However, Applicant respectfully traverses the Examiner's reasoning outlined above.

First and foremost, the Examiner seems to use the two separate and distinct processes disclosed in Ryabov, et al. (highlighted above), and relied upon in the current Office Action, interchangeably. In particular, the Examiner states, "However, temperature range of 50-110°C embraces 50°C." However, as outlined *supra*, only the preparation of 5-methyl-4,5-dihydro-6H-cyclopenta[b]thiophen-6-one was carried out at 50°C, and was done so with an **inorganic acid** to produce a **40% yield**, whereas the preparation of a mixture of 2-methyl-2,3-dihydro-1H-cyclopenta[b][1]-benzothiophen-1-one and 2-methyl-1,2-dihydro-3H-cyclopenta[b][1]benzothiophen-3-one was carried out at **room temperature** and stepwise, and not **simultaneously** and **at 50 to 110°C** as currently claimed. However, the Examiner has not addressed these

fundamental, factual differences. However, this is the Examiner's initial burden in establishing a *prima facie* case of obviousness. See MPEP §2143. Accordingly, for this reason alone, Applicant respectfully believes the current rejection should be withdrawn.

Notwithstanding, Applicant respectfully traverses the Examiner's contention,

Changing the temperature, ratios of formula II:III and the amounts of the acid and absorbent is a mere optimization of variables, which is not patentable absent unexpected result due to each variable, which is different in kind and not merely in degree from that of the prior art. In re Aller, 22 F.2d 454, 105 USPQ 233 (CCPA, 1955), In re Boesch and Slaney, 205 USPQ 215 (CCPA, 1980). For formula IV to produce formula I, it must dissociates in solution to 2 molecules of formula III.

Therefore, the instant invention is *prima facie* obvious from the teaching of Ryabov et al. One of ordinary skill in the art would have known to change the temperature, ratios of the starting reagents and the amounts of the acid and absorbent, at the time the invention was made. The motivation is to optimize the yield of the product.

However, the facts of *In re Aller* are clearly different than those of the instant application. In particular, *In re Aller* relates to identical processes (i.e., identical in steps and constituents of the process), in which the **only** difference between appellants process and the prior art resided in the temperature in which the process was carried out, and the concentration of the sulfuric acid used. This, however, is markedly different than the facts before the Examiner.

In particular, not only is Applicant's currently claimed

process different than those disclosed in Ryabov, et al., which the Examiner has acknowledged (see page 4, lines 1-3 of the current Office Action), Applicant's currently claimed process produces a new and unexpected result as discussed in detail below.

As for *In re Boesch*, *In re Boesch* relates to **result effective variables**. However, Applicant respectfully believes the Examiner has not identified what, if any, **result effective variable** is supposedly being optimized in Applicant's currently pending claims, much less demonstrated with objective, factual evidence that whatever supposed result effective variable the Examiner is referring to, was so recognized as a result effective variable in the art. See *In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA 1977). In fact, Applicant respectfully believes Ryabov, et al. discloses just the opposite.

In particular, as outlined above, Applicant respectfully believes Ryabov, et al. discloses two distinct, separate processes in which Scheme 2 is carried out at 50°C, but with an **inorganic acid** to produce a **40% yield**, and Scheme 4 is carried out at **room temperature**, and not **simultaneously** as currently claimed by Applicant, to produce a **66% yield**. Accordingly, even if one were to start from Scheme 4 and modify it by carrying the process out in a one-pot synthesis and at a temperature of 50°C, as purported by the Examiner, which Applicant respectfully denies one would do given the express disclosure of Ryabov, et al., even then Applicant respectfully believes one of ordinary skill in the art would expect

to produce a yield similar to that obtained in Scheme 2, which was 40%.

However, Applicant has unexpectedly found Applicant's currently claimed process produces an unexpected increase in yield. In fact, as outlined on page 10, lines 1-13, and Table 1, Example 4, Applicant unexpectedly found when Applicant's currently claimed process is used to synthesize 2-methyl-1,2-dihydrobenzo[b]cyclopenta[d]thiophen-3-one, which is the same end product produced in Scheme 4 of Ryabov, et al., the process produces approximately a **73% yield**. Accordingly, Applicant's currently claimed process produces a yield that is nearly double what Applicant believes one of ordinary skill in the art would have expected.

Accordingly, if the Examiner maintains the current rejection and continues to rely on *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980), Applicant respectfully requests the Examiner to identify, (i) what variable, or variables, in Applicant's currently pending claims the Examiner is asserting is a result effective variable, (ii) objective, factual evidence supporting the Examiner's assertion that the identified result effective variable, or variables, from (i) were in fact recognized in the art to be result effective variables, and (iii) how the supposed result effective variable from (ii) is supposedly being optimized in Applicant's currently pending claims. See *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980) and *In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA

1977).

Further, Applicant respectfully responds as follows with respect to the Examiner's contention,

Alternatively, Applicant has done no more than combine separate but well-known inventions (two separate processes by Ryabov et al). While the combination may perform a useful function it did no more than what they would have done separately. In re Anderson, 396 U.S. 57, 163 USPQ 673 (1969) cited in KSR Int. Co. v. Teleflex Inc, 550 U.S. ----, 82 USPQ2d 1385 (2007).

When a patent simply arranges old elements with each performing the same function it has been known to perform and yields predictable result, the combination is obvious. In re Sakraida, 425 US 273, 189 USPQ 449 (1976) cited in KSR, supra. A patent for such combination 'obviously withdraws what is already known into the field of its monopoly.' Great Atlantic & Pacific Tea Co. v. Supermarket Equipment Corp., 340 U.S. 147, 187 USPQ 303 (1950), cited in KSR, supra.

However, as outlined *supra*, Applicant's currently claimed process produces unexpectedly higher yields, which is not, as the Examiner contends, the same as what the two processes of Ryabov, et al. would have done separately, or yields predictable results. In fact, as cited by the Examiner,

While the combination may perform a useful function **it did no more** than what they would have done separately. In re Anderson, 396 U.S. 57, 163 USPQ 673 (1969) cited in KSR Int. Co. v. Teleflex Inc, 550 U.S. ----, 82 USPQ2d 1385 (2007). (Emphasis added)

However, as outlined *supra*, this is not the case in the instant application. In fact, as demonstrated by Applicant, Applicant's currently claimed process is not only different than the processes of Ryabov, et al., Applicant's currently claimed process produces

unexpectedly higher yields than those of Ryabov, et al.

In light of the above, claims 1-8 and 10-15 are therefore believed to be patentable over Ryabov, et al. Accordingly, reconsideration and withdrawal of the rejection is respectfully requested.

CONCLUSION

Based upon the above remarks, the presently claimed subject matter is believed to be novel and patentably distinguishable over the references of record. The Examiner is therefore respectfully requested to reconsider and withdraw all rejections, and allow all pending claims 1-8 and 10-15. Favorable action with an early allowance of the claims pending in this application is earnestly solicited.

The Examiner is welcomed to telephone the undersigned practitioner if any questions or comments arise.

Respectfully submitted,

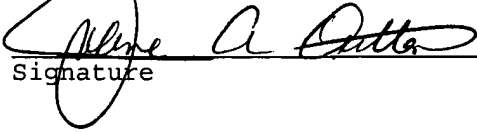
By: 

Jarrod N. Raphael
Registration No. 55,566
Customer No. 34872

Date: March 28, 2008
Basell USA Inc.
Delaware Corporate Center II
2 Righter Parkway, Suite 300
Wilmington, Delaware 19803
Telephone No.: 302-683-8176
Fax No.: 302-731-6408

Serial No. 10/539,683

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